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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/727,424	12/01/2000	Hiroataka Kaji	YAMAH5.970A	4402

20995 7590 04/16/2004

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EXAMINER

PEREZ DAPLE, AARON C

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 04/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

3

Office Action Summary

Application No.

09/727,424

Applicant(s)

KAJI ET AL.

Examiner

Aaron Perez-Daple

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 16-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 16-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to Amendment entered 3/5/04, which has been fully considered.
2. **Claims 1-12 and 16-27** are presented for examination.
3. **Claims 13-15** is cancelled.
4. This action is non-FINAL.

Response to Arguments

Claim Objections

5. Objections to claim 1 are hereby withdrawn in view of the Amendment.

112 Claim Rejections

6. The rejection of claims 11 and 16-27 under 35 U.S.C. 112, second paragraph, is hereby withdrawn.
7. The rejection of claim 12 under 35 U.S.C. 112, second paragraph, is hereby maintained. Specifically, Applicant did not address the basis for the rejection as indefinite because of the limitation, "predetermined input information," in line 4. The source of the input information is not clear to the examiner. Furthermore, if the input information is externally generated, it is not clear how it can also be "predetermined." For the purposes of applying prior art, the examiner interprets that "predetermined" means not selected by the user.

102 Claim Rejections

8. Applicant's arguments filed 3/5/04 have been fully considered but they are not persuasive.

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9. Claims 1-4, 6, 9, 11, 12, 16, 17 and 26 have been rejected under 35 USC 102(b) as anticipated by Kamihira et al. (EP 0957416) (hereinafter Kamihira). Applicant acknowledges that Kamihira teaches the basic features of the present invention [pg. 6, fifth paragraph], but asserts that Kamihira fails to teach a single control module which evolves both interactively and autonomously as recited in the amended claims. The Examiner respectfully disagrees. First, it is clear that modules may be hierarchical (i.e. a module may include sub-modules). This is illustrated in Applicant's own Figs. 4 and 5 (cited by Applicant as supporting the new claim limitation), where a "unit" is interpreted as equivalent to a "module." In other words, Figs. 4 and 5 depict a control module which includes sub-modules (units) for interactive and autonomous evolution. Kamihira discloses the same fundamental relationship. For example, Fig. 6 may be interpreted as including a single module with sub-modules for interactive and autonomous evolution. The "optimized parameters" would include both drivability and fuel efficiency parameters. Moreover, although not necessary for the rejection, it is understood by one of ordinary skill in the art that the drivability and fuel efficiency parameters may overlap. That is, a single parameter may impact both drivability and fuel efficiency and therefore be evolved under both schemes.

Furthermore, Applicant's arguments are directed towards a specific embodiment of the invention, as described above. The more general disclosure of the invention also anticipates the claim limitations for different reasons. Specifically, Kamihira discloses that autonomous and interactive evolution may be used together in a single module (or sub-module). See paragraph 0027, "With the foregoing structure...the evolution/adaptation layer." This is also seen in Fig. 1, which discloses the input of both a user evaluation [3] and environmental

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input [2] for selective evolution of a single control module [19] under either an autonomous or interactive scheme.

For all of the above reasons, claims 1-4, 6, 9, 11, 12, 16, 17 and 26 are properly rejected under 35 USC 102(b) as anticipated by Kamihira.

103 Claim Rejections

10. As for the rejection of claim 5 under 35 USC 103(a) as unpatentable over Kamihira in view of Arai, Applicant traverses the rejection on the basis that Arai does not teach the new limitation of amended claim 1. As demonstrated above, Kamihira teaches this limitation. Therefore, the rejection is properly maintained for the reasons originally cited.
11. As for the rejection of claims 7, 8 and 27 under 35 USC 103(a) as unpatentable over Kamihira in view of Bonissone, Applicant traverses the rejection on the basis that Bonissone does not teach the new limitation of amended claim 1. As demonstrated above, Kamihira teaches this limitation. Therefore, the rejection is properly maintained for the reasons originally cited.
12. As for the rejection of claims 10 and 18-25 under 35 USC 103(a) as unpatentable over Kamihira, Applicant traverses the rejection on the basis that Kamihira does not teach the new limitation of amended claim 1. As demonstrated above, Kamihira teaches this limitation. Therefore, the rejection is properly maintained for the reasons originally cited.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

14. **Claims 1-4, 6, 9, 11, 12, 14-17, and 26** are rejected under 35 U.S.C. 102(a) as being anticipated by Kamihira et al (EP 0957416) (hereinafter Kamihira).

15. As for claim 1, Kamihira teaches a method for optimizing operation of a machine assembly while being manipulated by a user, said machine assembly comprising plural replaceable devices, each device being operated by a control module, the input-output relationship of which control module is regulated by control parameters, said method comprising the steps of:

a) operating the machine using control modules [paragraph 0007, “To attain the foregoing...object is operating.”];

b) during step a), optimizing the input-output relationship of at least a single control module by coding into template parameters [parameters 18, Fig. 1] fully or partially regulating said single module, said templates of said single control module being subjected to heuristic processing [paragraph 0089, “As described above...of time and effort.”], wherein output of the machine assembly is evaluated based on a combination of the user’s ultimate choice during the operation and a preselected target used separately, to obtain at least one fitted set of parameters at each evaluation for said single control module, the parameters of which are optimized based on both of the evaluations [paragraphs 0079-0080, “As described above...interactive module.”]; and

c) operating the machine assembly using the optimized control module [paragraph 0089, “As described above...of time and effort.”; Fig. 5].

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16. As for claim 2, Kamihira teaches the method according to claim 1, wherein the control module comprises a main control module [interpreted as comprising air/fuel ratio control module 33 and the associated evolution and learning units 23 and 27, Fig. 6] and an auxiliary control module [interpreted as comprising throttle control module 20 and the associated evolution and learning units 8 and 12, Fig. 6] for adjusting output of the main control module, and step (b) is conducted on the auxiliary control module [paragraphs 0079-0080, "As described above...interactive module."].
17. As for claim 3, Kamihira teaches the method according to claim 2, wherein the main control module and the auxiliary control module are arranged in series [paragraph 0029, "Further, as shown...short period of time."].
18. As for claim 4, Kamihira teaches the method according to claim 2, wherein the main control module and the auxiliary control module are arranged in parallel [Fig. 6; paragraph 0028, "Also, as shown in...through evolution growth."].
19. As for claim 6, Kamihira teaches the method according to claim 1, wherein the heuristic processing is evolutionary computation, and the templates are chromosomes [paragraph 0089, "As described above...of time and effort."; note that the evolved parameters or properties comprise chromosome templates].
20. As for claim 9, Kamihira teaches the method according to claim 1, wherein the machine assembly is a watercraft [paragraph 0030, "Next, an implementation...any type of vehicle)."].

21. As for claim 11, Kamihira teaches an optimization apparatus for optimizing an operation characteristic of a unitary apparatus that can be used as a combined apparatus by combining other apparatuses used by a user, the optimization apparatus comprising:

an optimization process device [control apparatus 10, Fig. 5] for optimizing the operation characteristic of the unitary apparatus, with a functional characteristic of the combined apparatus as an evaluation criterion, said optimization device comprising:

(i) at least a single control module regulated by control parameters for controlling operation of the unitary apparatus [throttle control module 20, Fig. 6];

(ii) an autonomous evolutionary process unit for optimizing the operation of said single control module by selecting a portion of the control parameters based on a predetermined evaluation criterion [learning layer 12, Fig. 6; paragraphs 0072-0073, "When the evolution...evolution/adaptation layer."];

(iii) an autonomous evaluation unit for evaluating the operation of the unitary apparatus and providing the evaluation to the autonomous evolutionary process unit [air/fuel ratio control module 33, Fig. 6];

(iv) an interactive evolutionary process unit for optimizing the operation of said single control module by selecting another portion of the control parameters based on the user's choice during the operation of the unitary apparatus [evolution/adaptation layer 6, Fig. 6; paragraphs 0072-0073, "When the evolution...evolution/adaptation layer."]; and

(v) an evaluation input unit for inputting by the user an evaluation of the operation of the unitary apparatus to the interactive evolutionary process unit [evaluation 4, Fig. 6].

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22. As for claim 12, Kamihira teaches the optimization apparatus of claim 11, wherein the control module is used as an auxiliary control module [throttle control module 20, Fig. 6], and the optimization apparatus further comprises a basic control module [fuel economy module 33, Fig. 6] for deciding a manipulated variable of the unitary apparatus based on predetermined input information, said auxiliary control module being arranged and connected in parallel to or in series with the basic control module [shown connected in parallel, Fig. 6].

The examiner further points out with respect to claim 12 that applicant has not claimed the specific arrangement shown in figures 1a and 1b, as asserted in applicant's argument with respect to claim 12. Specifically, applicant has not claimed the relationship between the input and output signals shown in figures 1a and 1b. Claim 12 could reasonably be interpreted to read on either embodiment presented by applicant in the argument for claim 12 (pg. 19 of the amendment).

23. As for claim 14, Kamihira teaches the optimization apparatus of claim 11, further comprising an autonomous evaluation unit for evaluating the operation of the unitary apparatus and providing the evaluation to the autonomous evolutionary unit [evaluation unit 7, Fig. 6].
24. As for claim 15, Kamihira teaches the optimization apparatus of claim 11, further comprising an evaluation input unit for inputting by the user an evaluation of the operation of the unitary apparatus to the interactive evolutionary unit [inherent for input of evaluation 4, Fig. 6].

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25. As for claim 16, Kamihira teaches the optimization apparatus of claim 11, wherein the optimization unit carries out operation with regard to optimization using heuristics [paragraph 0089, "As described above...of time and effort."].
26. As for claim 17, Kamihira teaches the optimization apparatus of claim 16 wherein the heuristics is an evolutionary calculation method [paragraph 0089, "As described above...of time and effort."].
27. As for claim 26, Kamihira teaches the method according to claim 1, wherein the evaluation of output of the machine assembly by the user's ultimate choice and that by the preselected target are switched based on time or the user's choice [paragraph 0078, "When the user reads...can be resumed."].

Claim Rejections - 35 USC § 103

28. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

29. **Claim 5** is rejected under 35 U.S.C. 103(a) as being obvious over Kamihira (EP 0957416) in view of Aria et al (US 5,418,721) (hereinafter Aria). Kamihira does not specifically disclose a central control module and multiple local control modules wherein step (b) is conducted on the central control module. Aria teaches a supervisory control system in a vehicle with multiple local control modules each receiving signals from the

central control module and outputting signals to the respective replaceable devices [Fig. 1; col. 1, lines 32-49, "For example, there...a horn sound."].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kamihira by using local control modules and performing step (b) on a supervisory control module, because this would allow for supervisory control of multiple vehicle systems, as taught by Aria [col. 1, lines 32-49, "For example, there...a horn sound."].

30. **Claims 7, 8 and 27** are rejected under 35 U.S.C. 103(a) as being obvious over Kamihira (EP 0957416) in view of Bonissone et al (US 5,995,737) (hereinafter Bonissone). As for claims 7 and 8, Kamihira does not specifically disclose providing a fuzzy inference system regulated by preselected parameters. However, Bonissone discloses a method similar to that of claim 1 further comprising providing a fuzzy inference system regulated by preselected parameters, and the optimization step is conducted by at least one of the following:

- (i) revising the fuzzy rule matrix by extracting a section from the matrix and coding elements of the section into chromosomes [Fig. 7];

- (ii) modifying the configuration of the fuzzy rule matrix defined by membership functions by coding elements of the membership functions into chromosomes [Fig. 7]; or

- (iii) changing a level of an input of the parameters and a level of an output of the fuzzy inference system by coding elements of the levels into chromosomes [Fig. 7; col. 4, lines 45-64, "In this invention...the search space."].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Kamihira with Bonissone in order to allow for smooth control of the combined apparatus and minimal error of a controlled variable, as taught by Bonissone [col.

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1 line 55 - col. 2 line 7, "This invention...the velocity profiler."]. It would further have been obvious to one of ordinary skill in the art to evaluate by the user the output of the fuzzy inference system, since Kamihira teaches user evaluation of the output of the control system [paragraphs 0079-0080, "As described above...interactive module."].

31. As for claim 27, Kamihira does not disclose a fuzzy inference system. However, Bonissone teaches a method similar to claim 7, wherein the section extracted in (i) and/or the membership functions to be modified in (ii) are/is evaluated by the preselected target value [step 46, Fig. 7].
32. **Claims 10 and 18-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamihira (EP 0957416). As for claim 10, Kamihira teaches the application of a global control method to an electronic throttle (e.g. figure 5), and he further teaches the use of a global control system for any type of vehicle(e.g. col. 5 line 57 through col.7 line 2). A trim apparatus is a standard replaceable device on a watercraft. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kamihira such that the replaceable devices include a trim apparatus and an electronic throttle.
33. Claims 18-25 apply the generic control system of claim 11 to various embodiments, and they can be said to represent species of the generic control system of claim 11. Kamihira discloses a generic control system similar to applicant's which can be applied to a wide range of different embodiments where optimization or adaptation of a system to user preferences is important [col. 1, lines 34-54].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the control system of Kamihira to the various embodiments of claims 18-

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25, since Kamihira teaches the use of a generic control system for the purpose of adapting a system to the preferences of different users.

Conclusion

34. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron Perez-Daple whose telephone number is 703-305-4897. The examiner can normally be reached on 9am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anil Khatri can be reached on 703-305-0282. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 3/31/04
Aaron Perez-Daple


Anthony Knight
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